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Issues Associated With the Measurement of Psychosocial Benefits of Group Audiologic Rehabilitation Programs

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The purpose of this review is to describe the psychosocial effects of hearing loss, review the literature that has attempted to measure the psychosocial benefits of group audiologic rehabilitation programs, and offer suggestions for the design of future studies. The psychosocial aspects of hearing loss are multidimensional and may include the emotional, cognitive, interpersonal, behavioral, and physical responses to hearing loss. As a result of the stigma of hearing loss, individuals may isolate themselves, avoid social interactions, and/or bluff their way through communication breakdowns. Participation in group audiologic rehabilitation programs is a straightforward way to deal with the stigma and the loss of social identity associated with hearing loss, and these groups are an ideal forum for teaching communication strategies. Yet, the literature on the efficacy of group audiologic rehabilitation has produced equivocal results. Several factors may have contributed to the lack of psychosocial benefits reported in the literature, including the theoretical framework upon which the program was designed, the actual class content, the effectiveness of the outcome measures, and the demographic characteristics of the participants in the programs. Future research should determine (1) if the theoretical framework and/or the content covered in group audiologic rehabilitation programs influences the psychosocial outcomes, (2) if instructor training influences psychosocial outcomes, (3) the ideal test battery to assess the psychosocial benefits of group audiologic rehabilitation programs, (4) the participant demographic and personality characteristics that influence psychosocial outcomes, and (5) whether experienced hearing aid users have different hearing-loss related psychosocial needs than new hearing aid users.

Keywords: group audiologic rehabilitation; aural rehabilitation; psychosocial benefits

The purpose of group audiologic rehabilitation programs for adults with hearing loss is to provide information, training, and psychosocial support. Recently, Hawkins[1] conducted a systematic review to examine the effectiveness of group audiologic rehabilitation programs. Hawkins described 13 studies that evaluated group audiologic rehabilitation programs. Each study used a randomized control trial, a quasi-experimental design, or a nonintervention cohort design. Hawkins concluded that there are short-term psychosocial benefits from adult audiologic rehabilitation groups. These benefits may include reduced self-perceived hearing handicap, improved self-perceived quality of life, and improved use of communication strategies. Unfortunately, only 2 of the 13 studies attempted to measure long-term benefits with reevaluations more than 6 months after the treatment was complete. As a result, Hawkins could not draw any conclusions about the long-term psychosocial benefits of group audiologic rehabilitation.

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It is important to note that not all of the studies that Hawkins[1] reviewed demonstrated psychosocial benefits as a result of the group classes. Several factors may have contributed to a lack of statistically significant results, including the actual audiologic rehabilitation content being taught in the classes, the effectiveness of the outcome measures used, or the demographic characteristics of the participants in the programs. To understand the outcomes of studies that measured the effectiveness of group audiologic rehabilitation in the psychosocial domain, it is important to have a clear understanding of the possible psychosocial benefits that may occur as a result of participation in group audiologic rehabilitation. The purpose of this review is to briefly describe the psychosocial effects of hearing loss, to use this knowledge to review the relevant literature, and to offer suggestions for the design of future studies.

Psychosocial Effects of Hearing Loss

The psychosocial aspects of hearing loss are multidimensional and have been well described in the literature.[2-4] Trychin[4] has classified reactions to hearing loss in terms of emotional, cognitive, interpersonal, behavioral, and physical responses. For the purpose of this review, each of these responses will be considered as a dimension that, taken together, determines an individual's psychosocial reaction to his or her hearing loss.

1. Emotional reactions: This dimension refers to the stigma of hearing loss and may include shame, guilt, anxiety, anger, frustration, embarrassment, and depression.
2. Cognitive reactions: These reactions may include inattentiveness, difficulty in concentration, low self-esteem, or low self-confidence. This may also include increased effort required for comprehension in difficult listening situations.
3. Interpersonal reactions: These responses may include bluffing, social withdrawal, dominating conversations, and a loss of intimacy in relationship(s).
4. Behavioral reactions: These reactions may include a limitation of activities or self-isolation.
5. Physical reactions: These include health issues that can be caused or exacerbated by hearing loss such as fatigue, muscle tension, headaches, stomach problems, and sleep problems.

It is important to note that many of the emotional, interpersonal, and behavioral reactions to hearing loss are experienced by both the individual with the hearing impairment as well as his or her significant others.[2,4]

Hétu[2] developed a framework for understanding the psychosocial effects of hearing loss. He explained that most individuals consider their hearing loss to be a "stigma," and he defined a stigma as a discredited or discreditable attribute. In other words, a stigma is the shame or disgrace associated with something that is regarded as socially unacceptable. As a result of the stigma of hearing loss, individuals may isolate themselves, avoid social interactions, and/or bluff their way through communication breakdowns. These behaviors and feelings can result in a change of one's social identity and can result in an enduring sense of social uncertainty.[2,3]

Participation in group audiologic rehabilitation programs is a straightforward way to deal with the stigma and the loss of social identity associated with hearing loss.[2] In such a group, all members share the stigma of hearing loss; as a result, hearing loss becomes typical rather than deviant. In a supportive group, individuals with hearing loss can share their experiences, their feelings, and their frustrations. Participation in a group reinstates the feeling of belonging.[2] Group leaders can directly address these issues with activities designed to evoke the feelings, behaviors, and physical effects associated with hearing loss.[3]

Once individuals accept the stigma associated with hearing loss, they can begin to deal constructively with the communication difficulties that hearing loss may impose. To achieve effective communication, the individual with hearing loss must first admit to having a hearing loss and, second, must propose solutions.[3,5] Participation in an audiologic rehabilitation group is an ideal forum for teaching communication strategies: skills to anticipate and/or repair communication difficulties. In the group, participants will have the opportunity to role-play the management of difficult situations in an assertive fashion.[3,5] In a supportive group environment, individuals can share their fears about admitting their hearing loss, and they can practice effective communication techniques.

Procedural Factors on Audiologic Rehabilitation Group Outcomes

Guidelines exist that provide detailed recommendations for the fitting and validation of hearing aids in adults,[6,7] but no detailed guidelines are available for the provision of adult audiologic rehabilitation

programs. A number of materials are available that have been specifically designed for group audiologic rehabilitation use or can be adapted for group use. For example, Hétu and Getty[8] and Hogan[3] have created structured activities designed to assist members in a group to identify the emotional, behavioral, physical, cognitive, and interpersonal reactions to hearing loss. Exercises demonstrating an assertive approach to communication can be found in Kaplan et al.[5] Additional communication strategies for individuals or for group classes can be found in a variety of sources.[3,5,9-11] Models exist that emphasize the inclusion of significant others in the group process[8]; such models typically include participation of spouses and/or family members in informational lectures, psychosocial support discussions, and communication skills development. Because no standard group programs exist, research studies (and practicing clinicians) have used different procedural variables in the provision of group audiologic services; differences in these variables may have contributed to the diversity of results in published studies that have evaluated group audiologic rehabilitation programs.[1]

Procedural factors that may explain the variability in outcomes for group audiologic rehabilitation include: the material that is covered in the group program, the length of the program, the frequency of the program, and the program leader. There has been very little attention paid to class content in the literature. Most studies that measured the psychosocial benefits of audiologic rehabilitation training have used a combination of informational lectures and communication strategies training as the material covered in the group classes. Review of the methods sections of published studies that have examined the outcome of group audiologic rehabilitation programs reveals that it is often not possible to determine how much class time was devoted to each activity and if any time was devoted exclusively to group discussion designed to reduce the stigma associated with hearing loss.

For example, one of the first research studies that actually attempted to measure the benefits of group audiologic rehabilitation programs was by Abrams and colleagues.[12] They evaluated benefits of participation in a group audiologic rehabilitation class in 3 groups of subjects. A treatment group of 11 subjects received hearing aids and participated in a 3-class audiologic rehabilitation program, a second treatment group of 11 subjects received hearing aids but did not participate in an audiologic rehabilitation program, and a control group of 9 subjects did not receive any treatment. The audiologic rehabilitation program was described as a counseling-based program designed to reduce the communication and psychosocial difficulties associated with hearing loss. The program included informational lectures about the anatomy of the ear, hearing loss, the communication process, and assistive devices. The program also included speechreading and communication strategies instruction. Each class was 90 minutes in length and met once a week for 3 weeks. Both treatment groups demonstrated a significant reduction in hearing handicap,* as measured by the Hearing Handicap Inventory for the Elderly (HHIE), whereas the control group did not. The group that received hearing aids and group audiologic rehabilitation classes had a significantly greater reduction in hearing handicap than the group that received hearing aids. In subsequent studies, this same group of researchers has expanded the rehabilitation program to include increased content and increased practice time in a 2-hour class meeting once a week for 4 weeks.[15,16]

Brewer[17] offered class content, similar to Abrams et al,[12] over a longer period of time. Classes met for 8 to 10 weeks, resulting in at least 15 hours of participation. The rehabilitation program included informational counseling, communication strategies training, speechreading training, and auditory-visual speech perception training. After completion of the program, only 5 of the 35 subjects (14%) showed a significant reduction in hearing handicap, as measured by the Hearing Handicap Inventory for Adults (HHIA). In the Brewer study, individuals participated in group classes for at least 15 hours, and in the Abrams et al study, individuals participated for 4.5 hours. Yet, significant psychosocial benefits were measured in the Abrams et al study but not in the Brewer study. The lack of benefit in the Brewer study is likely not due to the course content because both studies used similar content; the lack of benefit in the Brewer study is

*Currently, it is more appropriate to refer to participation restrictions and activity limitations as they relate to hearing loss, rather than hearing handicap, as outlined by the World Health Organization's International Classification of Functioning, Disability, and Health.[13] However, *hearing handicap* is the term most commonly used in the literature, and it is the construct measured by the Hearing Handicap Inventory for the Elderly,[14] the tool used most frequently to measure the psychosocial benefits of group audiologic rehabilitation. Therefore, *hearing handicap* will be the term used to describe the participation restrictions and activity limitations as they relate to hearing loss in this article.

likely not due to the outcome measure used because both studies used the same outcome measure. It is possible that the lack of benefit in the Brewer study is due to demographic characteristics of their subjects; this will be discussed further in a later section.

Of all of the studies reviewed by Hawkins,[1] only 2 actually varied the class content. Smaldino and Smaldino[18] provided a traditional audiologic rehabilitation program to a group of 10 individuals. An additional group of 10 participants was evaluated with a questionnaire to determine their cognitive learning style; they received the traditional audiologic rehabilitation program, plus they were informed individually about their particular cognitive learning styles. The authors proposed that new hearing aid users could use information about their personal cognitive learning styles to improve their use of communication strategies and improve overall communication with their new hearing aids. Although material about cognitive learning styles was not actually included in the group classes, it was theorized that individuals who learned about their cognitive learning style could use this information to enhance the class experience. Following class participation, both groups of participants demonstrated a significant reduction in hearing handicap, but there were no differences measured between the 2 treatment groups. This is an example where an addition to the class content did not improve outcomes.

Another study that attempted to evaluate a change in class content did so by varying the inclusion of significant others in the rehabilitation classes. Preminger[19] evaluated 2 types of group programs, both of which included informational lectures, communication strategy training, auditory speech perception training, and auditory-visual speech perception training. One group of participants with hearing loss (n = 12) attended classes on their own, and a second group of individuals with hearing loss (n = 13) attended classes along with a significant other. Discussions about the challenges of living with hearing loss were held in all classes. When significant others were in the classes, the leader focused discussion on the effects of hearing loss on both the individual with hearing loss and on the non-hearing-impaired individual. The class content also changed when significant others were in the classes because communication strategies could be practiced by both individuals with hearing loss and the person with whom they communicated most often. The results showed that individuals with hearing loss in both types of classes demonstrated a significant reduction in hearing handicap as measured by the HHIE/A; however, the individuals who participated in the classes with their significant others had a greater reduction in handicap than those who participated on their own. This is an example where a change in the class content did improve outcomes.

Another way that class content can be varied is by the adaptation of content to focus on the individual needs of the class participants. Gagné and Jennings[20] describe audiologic rehabilitation as a problem-solving process in which individuals with hearing loss identify their unique problems, assist in the development of solutions, and assist in the evaluation of the outcomes. This process may occur naturally in rehabilitation groups. The group leader can ask participants to volunteer communication problems, and members can collaborate in the development of repair strategies. At future meetings, group members can discuss the outcomes of all implemented strategies and discuss why other strategies were not attempted. Although programs reported in the literature may have allowed for the adaptation of course content to meet individual needs, the evaluation of such programs has not been discussed in the literature.

A procedural variable that has not been considered in the literature is the length and the frequency of the rehabilitation class program. It is not clear how much time should be devoted to the group audiologic rehabilitation program. Significant benefits have been reported after only three 90-minute sessions,[12] but it has not been shown that more time is better[17] or that a minimum amount of time is necessary. Many hearing aid patients are not interested in returning to their audiologist for weekly rehabilitation groups; it would be useful to determine whether significant psychosocial outcomes could be achieved after only 1 or 2 group classes.

A final procedural variable that may influence the efficacy of group audiologic rehabilitation programming are the qualifications and training of the class leader. Most studies reported in the literature are led by audiologists, yet audiologists typically receive very little training in counseling or in group facilitation in their academic programs.[21,22] There are psychologists who conduct group audiologic rehabilitation programs,[4,23] but these reports in the literature are rare. It seems likely that collaboration between psychology, social work, and audiology would lead to optimum outcomes. Recently, Heydebrand and colleagues[23] reported on group audiologic rehabilitation groups for adult cochlear implant users. Their programs were led

jointly by a clinical psychologist and 2 audiologists. The content included traditional audiologic rehabilitation activities focusing on the psychosocial effects of hearing loss and on developing effective communication strategies and techniques.[3,8] In addition, they used psychotherapeutic techniques structured on a cognitive-behavioral framework to challenge assumptions about the outcomes of hearing loss.[23] At the completion of the program, class members reported positive outcomes on measures of assertiveness, emotional well-being, and coping behaviors. Unfortunately, no data are available that can be used to determine whether the addition of psychotherapeutic techniques, both those that take a cognitive-behavioral framework as well as other theoretical frameworks, actually improves outcomes.

Group audiologic rehabilitation programs can also be led by individuals with hearing loss.[24,25] Recently, Barlow and colleagues[25] described a 6-week audiologic rehabilitation program focused on increasing self-efficacy in the class participants. They trained lay tutors with hearing loss to lead these programs and supported the training with a written manual. Tutors were interviewed after team teaching a complete course. The tutors reported that teaching the course aided in the development of their own communication skills, and tutors reported better understanding of the needs of others with hearing loss.[25] It has yet to be determined, however, whether programs led by individuals with hearing loss offer more benefit for the participants than courses led by audiologists. Future research can also evaluate programs led by individuals with hearing loss in partnership with audiologists, psychologists, and/or social workers.

In summary, the effects of several procedural variables on the outcomes of group audiologic rehabilitation programs have been considered. These variables included the content included in the group classes, the inclusion of significant others in the group classes, the adaptation of the classes for individual needs, the length and the frequency of the class meetings, and the qualifications and training of the group leaders. Unfortunately, very limited data exist that have attempted to measure the effects of these variables on class outcomes. Research is necessary to determine if (and how) audiologic rehabilitation group class content influences outcomes. Most of the studies cited in the Hawkins[1] review did not indicate whether there was group discussion focused specifically on the psychosocial effects of hearing loss. Therefore, it is not clear whether time in audiologic rehabilitation class is better spent on discussing the cognitive, interpersonal, behavioral, and physical responses to hearing loss or if time is better spent on communication-strategy training exercises. In addition, it is not clear how much time should be spent on each of these activities. Future research is needed to determine whether group classes can effectively meet the individual needs of the members. Finally, future research is necessary to determine whether training of the class instructor is an important variable.

Issues in Measurement

Several measurement issues may influence group audiologic rehabilitation outcomes, including the tools selected to assess outcomes and potential interactions between multiple measures of outcome. One of the most commonly used outcome measures for determining the psychosocial effects of audiologic rehabilitation groups is a disease-specific quality-of-life scale: the HHIE.[14] The HHIE is a 25-item scale with 2 subscales: social function and emotional function (as it relates to hearing loss). This scale addresses the emotional and behavioral reactions to hearing loss, but it does not address the cognitive, interpersonal, and physical reactions to hearing loss. The HHIE (or a variation for individuals younger than 65 years of age, the HHIA[26]) has been used as an outcome measure in several studies that have attempted to measure the benefit of audiologic rehabilitation, including 3 of the 13 studies reviewed by Hawkins.[1] In some studies, the change scores for the HHIE have successfully discriminated between individuals who participated in group audiologic rehabilitation versus those who did not.[12] However, the HHIE has not always been sensitive to the effects of audiologic rehabilitation. As discussed previously, in the Brewer[17] study, only 5 of 35 participants demonstrated a significant improvement on the HHIA after participating in at least 15 group audiologic rehabilitation classes. Similar findings were reported by Kricos and Holmes[27]; statistically significant benefit was not measured for individual audiologic rehabilitation training in a group of participants where the HHIE was used as an outcome measure. It is likely that the participants in the Brewer study and in the Kricos and Holmes study did receive some psychosocial benefit as a result of the audiologic rehabilitation services that they received, but the HHIE was not sensitive to this change. It is possible that the individuals in these

studies may have received benefits for dimension(s) of the psychosocial aspects of hearing loss that are not measured by the HHIE. Another possibility is that the HHIE may not adequately sample the entire domain of emotional reactions to hearing loss.

At the University of Louisville, we have been offering group audiologic rehabilitation classes as a part of a research project designed to measure the effectiveness of these programs. One participant was DT, a 56-year-old male with relatively good hearing below 2000 Hz and a moderate to severe high-frequency hearing loss. His 3-frequency (.5, 1, and 2 kHz) pure-tone averages (PTAs) were 13.3 dB HL in the right ear and 36.7 dB HL in the left ear. He joined a group audiologic rehabilitation class after 1 year of monaural hearing aid use (left ear only). Prior to class participation, his HHIA score was 96. This was an unusually high score on the HHIA for an individual with such a mild hearing loss; Newman et al[26] reported a mean HHIA score of 42 for individuals classified as having a mild hearing loss (PTAs between 26 and 40 dB HL). However, the reported range of scores was between 0 and 90.[26] DT attended 6 group audiologic rehabilitation classes that met once a week for 60 minutes. During each class, there was an informational lecture on a topic of interest for people with hearing loss (eg, communication strategies, assistive listening devices), and there was a structured discussion devoted to the emotional, behavioral, and interpersonal aspects of hearing loss. Although most of the class participants shared freely during these discussions and willingly gave examples of communication breakdowns and solutions, DT rarely participated. After the completion of the class, DT completed the HHIA again and scored a 92, a 4-point decrease in hearing handicap. This is not a significant improvement; Newman et al[28] report that scores on the HHIA need to differ by at least 12 points to be considered significantly different. After reviewing the postclass HHIA score, I had a conversation with DT, and I commented that it appeared that he did not find the classes to be very helpful. He disagreed emphatically and said that the class was very helpful. When I asked how the class was beneficial to him, he reported that the class gave him "courage." Courage is not a dimension covered in the emotional or behavioral subscale of the HHIA. It is possible that the structured discussions about the psychosocial aspects of hearing loss helped DT to resolve the stigma associated with hearing loss, but he was still developing the courage necessary to admit his hearing loss in public and to successfully use communication strategies.

Because of the limitations of the HHIE, it is possible that more extensive hearing loss–specific questionnaires may serve as better outcome measures. For example, the Communication Profile for the Hearing Impaired (CPHI)[29] is a 145-item questionnaire with 5 scales and 25 subscales. The scales include the following: Communication Performance, Communication Importance, Communication Environments, Communication Strategies, and Personal Adjustment. The CPHI has been used in a number of studies that have evaluated audiologic rehabilitation programming. In the Kricos and Holmes[27] study mentioned previously, benefit for individual audiologic rehabilitation was measured using the CPHI, whereas no benefit was measured using the HHIE. It does appear that an extensive scale such as the CPHI may be more sensitive to the psychosocial benefits of hearing loss. But the CPHI may not be the perfect solution. It takes a long time to administer (145 items), and it takes a long time to analyze (5 scales and 25 subscales). The CPHI is comprehensive but may not adequately sample the emotional, interpersonal, and behavioral responses to hearing loss. The CPHI does not measure cognitive or physical responses to hearing loss.

In addition to hearing loss–specific scales, generic health-related quality-of-life scales can be used to measure psychosocial outcomes. Generic scales can be used to compare the results of audiologic rehabilitation to other types of treatments. For example, the Short Form 36 Health Survey[30] (SF-36) is a 36-item scale that assesses 8 concepts: (1) limitations in physical activities because of health problems, (2) limitations in social activities because of physical or emotional problems, (3) limitations in usual role activities because of physical health problems, (4) bodily pain, (5) general mental health (psychological distress and well-being), (6) limitations in usual role activities because of emotional problems, (7) vitality (energy and fatigue), and (8) general health perceptions. Scores for each of the 8 concepts can be collapsed into 2 major domain scores: a mental component summary score and a physical component summary score. Abrams et al[15] used a form of the SF-36 as an outcome measure to compare a group of veterans with hearing loss who received a hearing aid versus a group that received a hearing aid plus 4 group audiologic rehabilitation classes. Both groups demonstrated a significant improvement on the mental component summary scores after the hearing aid fitting, but there was no significant difference in benefit measured between the 2 groups. Generic health-related quality-of-life

scales typically have very few questions devoted to hearing loss and communication, so it is not surprising that they are not very sensitive to audiologic rehabilitation intervention.[31]

Future research should be conducted to evaluate (or design) hearing-related quality-of-life scales that would be sensitive to the benefit that might be obtained from group audiologic rehabilitation services. We can look to the literature in other fields for examples of sensitive outcome measurements. Recently, Hevey et al[32] carried out a study to identify the questionnaire that was the most appropriate for measuring changes due to cardiac rehabilitation. Nine scales were evaluated, including disease-specific quality-of-life scales, generic quality-of-life scales, measures of anxiety, measures of depression, and scales of mood. These outcome measures were used to evaluate 130 individuals, half of whom received cardiac rehabilitation following cardiac treatment, and half of whom received cardiac treatment without follow-up cardiac rehabilitation. The scale most responsive to cardiac rehabilitation was the Global Mood Scale (GMS),[33] a measure of mood and anxiety that was designed specifically for patients with coronary heart disease. The GMS was adapted from the Positive and Negative Affect Schedule (PANAS),[34] a scale designed to measure mood. Rather than a scale that measures psychopathology, such as a depression scale, the PANAS measures 2 basic dimensions of self-rated mood. The positive affect scale rates an individual's enthusiasm, activity level, and alertness, whereas the negative affect scale rates an individual's aversive mood states, including anger, guilt, fear, and nervousness. As a result of a heart attack, most individuals do not experience psychopathology (eg, depression); rather, they experience a change in mood mediated by a change in their physical health status.[33] It is reasonable to assume that hearing loss affects individuals in a similar manner.

When selecting outcome measures to assess the psychosocial effects of audiologic rehabilitation, it is important to consider the entire test battery and how the individual evaluation measures may interact. Some audiologic rehabilitation studies include speechreading training and/or auditory speech perception training along with communication strategies training. As a result, evaluation batteries may include measures of auditory-alone speech perception and measures of auditory-visual speech perception, along with questionnaires designed to measure the psychosocial benefits of the program. It is possible that an individual's performance on the speech perception tests can influence outcomes on the psychosocial questionnaires. This possibility can be elucidated with another case study from the ongoing research program at the University of Louisville.

DG was a 63-year-old man who participated in a 6-week group class that included informational lectures about hearing loss and exercises designed to highlight the psychosocial effects of hearing loss. He had a mild to moderate hearing loss up to 1000 Hz and a profound hearing loss in the higher frequencies. All participants in this program received a comprehensive evaluation before and after class participation. This evaluation included the HHIE/A, a test of auditory-alone word and sentence recognition in noise, and a test of auditory-visual word and sentence recognition in noise. DG's HHIA score prior to the group class was an 86, and the score decreased 28 points to a 58 following the completion of the class. His auditory-alone and auditory-visual word and sentence recognition scores remained stable between the preclass and postclass evaluation sessions. When this individual came in for his postclass evaluation, he was very positive about the group program. At this visit, he brought in an unsolicited written evaluation of the communication classes. The following is an excerpt from his evaluation:

> The biggest benefit I received resulted from the testing you did prior to the classes. During the hearing test I was advised that I have a 40% gain from reading lips. I was so dumb, I did not realize I could read lips that well. Now I am really building on this skill. I now focus on people talking. Where I attend church, the minister's face is projected on a large screen. I can understand him for the first time simply by looking at his lips.

Subject DG reported that the "biggest benefit" that he received from his participation in this project was not due to the class content but was due to the preclass test battery. During the initial evaluation, he discovered that he was a good speechreader, and he then learned to take advantage of this skill. This finding is not unique. Kricos et al[35] used a similar test battery to evaluate the efficacy of individual audiologic rehabilitation. The test battery included the HHIE and a sentence test administered auditory-alone and auditory-visually. A control group of 13 subjects was evaluated twice, and as a group, they demonstrated a significant reduction in hearing handicap, as measured by the HHIE, despite the

fact that they received no intervention. Kricos et al[35(p77)] stated,

> It is interesting that 1 subject in the control group contacted the authors several weeks after her post-testing to thank us for helping her learn to deal with her disability. This was surprising because she received no therapy. The administration of the self-assessment itself could have a treatment effect by making the subject more aware of problems, thereby helping them problem solve themselves.

Although Kricos et al[35] postulate that the control subject may have benefited by considering the statements in the HHIE, it is also possible that this individual benefited from the administration of the auditory-alone and auditory-visual sentence recognition task and from receiving feedback on performance. Future research is necessary to determine whether participation in an auditory-alone and auditory-visual speech perception task can be used as an effective technique to demonstrate the importance of speechreading in everyday communication.

In summary, the influences of the evaluation measures and the interaction between evaluation measures on the outcomes of group audiologic rehabilitation programs have been considered. In developing future studies to assess the psychosocial benefits of group audiologic rehabilitation, it would be useful to consider all possible psychosocial effects of hearing loss. The reactions to hearing loss may be categorized in terms of emotional, cognitive, interpersonal, behavioral, and physical effects.[4] It would be useful to consider combinations of outcome measures that would encompass all of these areas. The HHIE does sample the emotional effects of hearing loss and the behavioral effects of hearing loss. The CPHI is a more comprehensive measure of the emotional, interpersonal, and behavioral effects of hearing loss. Additional scales that measure mood, such as the PANAS,[34] or scales that measure perceived stress[36] may be useful additions to the test battery.

Characteristics of the Audiologic Rehabilitation Class Participants

The final factor considered here, which may influence group audiologic rehabilitation outcomes, is the demographic and personality characteristics of the class participants. It is possible that demographic characteristics may be used to predict who might, and might not, benefit from group classes. Kricos[37] reviewed the audiologic literature to determine the participant demographic characteristics that may influence audiologic rehabilitation outcomes. She discussed several participant characteristics, including race, gender, age, personality, self-efficacy, social support, socioeconomic status, education, and health status. The demographic factors that have received the most attention in the audiologic rehabilitation literature are gender and age. For example, Kricos and Holmes[27] reported that gender and age did not influence the outcome of individual auditory training, but it may still be important to consider gender and age in future studies. Garstecki and Erler[38] reported that female hearing aid users were more likely to use effective communication strategies when compared to male hearing aid users. In addition, Garstecki and Erler[39] have reported gender differences on some subscales of the CPHI; in comparison with men, women are more likely to report communication problems, attach greater importance to effective communication in social situations, and use nonverbal communication strategies. Age may be an important factor to consider because older individuals typically report less hearing handicap than younger individuals with the same degree of hearing loss.[40,41]

Unfortunately, the demographic variables reviewed by Kricos[37] have rarely been examined in studies that have evaluated the effectiveness of group audiologic rehabilitation services. Beynon[42] et al is one of the few studies that did consider the effect of age; they measured the efficacy of group audiologic rehabilitation programs in first-time hearing aid users. A treatment group (n = 22) received new hearing aids plus participated in a 4-session communication course, and a control group received new hearing aids. Both groups demonstrated a significant reduction in hearing handicap, and the reduction in handicap was significantly greater for the treatment group than for the control group. The researchers assessed the influence of age; their subjects' ages ranged from 47 to 80 years. For each group of subjects, correlations between the changes in hearing handicap and subject age were calculated, but neither correlation was significant. It appeared that age did not influence the potential for benefit from participation in the group classes or from hearing aid use.

Another demographic characteristic that may be an important factor to consider in audiologic rehabilitation research is the service model within which the participants received their group classes. Cox et al[43] evaluated quality-of-life questionnaires from 230 older adults, before and after hearing aid fittings, from

Veterans Administration (VA) clinics and from private-pay audiology clinic settings. The VA patients demonstrated more benefit on the HHIE as a result of hearing aid fitting than the private-pay patients. This raises concern that VA patients or patients in any socialized medicine environment may have different psychosocial outcomes as a result of participation in group audiologic rehabilitation classes in comparison with private-pay individuals. Several of the studies that have evaluated the effectiveness of group audiologic rehabilitation have used VA patients as subjects[12,15,16] or have used patients from a national health care system.[42] Besides receiving hearing aids and hearing aid–related services at no cost, VA patients may be different from the average hearing aid user in other ways. VA patients are overwhelmingly men, plus Cox and colleagues have demonstrated that in comparison with private-pay patients, VA patients report greater hearing handicap (as measured by the HHIE) prior to hearing aid fitting.[43] These demographic considerations must be considered when generalizing results of studies using VA patients to the general population.

A final demographic variable that should be considered, but has not been investigated, is the duration of hearing aid use. A study by Chisolm et al[16] raises the possibility that duration of hearing aid use is an important demographic factor for consideration. They measured both short-term (postclass) and long-term (6-month and 1-year) benefits of a group audiologic rehabilitation program in new hearing aid users using the CPHI as an outcome measure. The treatment group (n = 44) participated in a 4-class audiologic rehabilitation program 2 weeks after hearing aid fitting. The control group (n = 47) received hearing aids alone. At the posttreatment evaluations, all subjects demonstrated significant improvement in "personal adjustment" and "communication strategies," as measured by the CPHI. The audiologic rehabilitation group demonstrated significantly more improvement for these scales at the posttreatment evaluation as compared to the improvement demonstrated by the hearing aid alone subjects. At the 1-year follow-up, the control group "caught up" to the treatment group; both groups demonstrated similar results for these scales. This finding raises the possibility that audiologic rehabilitation groups can accelerate the benefits of new hearing aid use. The fact that the control subjects, who only received hearing aids and who did not participate in an audiologic rehabilitation program, achieved the same level of improvement on the CPHI as the treatment group at a later date suggests that, given time, new hearing aid users may achieve the benefits of group rehabilitation programs on their own. If this is the case, then new hearing aid users may benefit the most from group programs. This makes sense from a theoretical standpoint. In comparison with experienced hearing aid users, new hearing aid users are more likely to be coping with the stigma of hearing loss, and new hearing aid users may not have had the opportunity to discover successful communication strategies on their own.

Almost all of the previous research that has demonstrated significant benefits for audiologic rehabilitation group participation was performed in new hearing aid users.[12,15-18,42] The Brewer[17] study, discussed previously, was one of the few studies that included experienced hearing aid users as subjects. This study evaluated the effectiveness of group audiologic rehabilitation in 35 participants; 19 of these individuals wore hearing aids, and the remaining individuals were unaided. Only 5 participants exhibited significant benefits from class participation, as measured by the HHIA; 3 of these individuals were described as long-term hearing aid users, 1 was described as a new hearing aid user, and 1 was not a hearing aid user. Years of hearing aid use was not described for the 30 individuals who did not demonstrate a significant benefit on the HHIA. Similarly, Kricos and Holmes[27] did not measure treatment effects for a group of individuals following individual audiologic rehabilitation using the HHIE as an outcome measure; all subjects in the study were experienced hearing aid users.

In summary, demographic characteristics of class participants may influence the outcomes of group audiologic rehabilitation programs. Future research is necessary to determine the effect of fee-for-service versus no-fee services on psychosocial outcomes. In addition, future research is necessary to determine whether experienced hearing aid users receive the same benefit from group classes as new hearing aid users. The fact remains that there are many experienced hearing aid users who report significant amounts of hearing handicap despite appropriate hearing aid fittings. Can these individuals receive psychosocial benefit from group audiologic rehabilitation classes? Do classes need to be specially designed for experienced hearing aid users? As discussed previously, group classes should help individuals overcome the stigma of hearing loss and learn successful communication strategies. It seems, then, that these programs would only be appropriate for experienced hearing aid users who have not accepted their hearing loss and/or who have not learned successful communication strategies. It may be possible to preselect unsuccessful communication strategy users with a scale such as the Communication Scale for Older

Adults.[44] It is not clear how to preselect experienced hearing aid users who still perceive their hearing loss as a stigma.

Conclusions

The purpose of this review was to describe the psychosocial effects of hearing loss, use this knowledge to review the literature that has attempted to measure the psychosocial benefits of group audiologic rehabilitation programs, and offer suggestions for the design of future studies. The following are suggestions for the design of future research of the psychosocial benefits of group audiologic rehabilitation:

1. Does the content covered in group audiologic rehabilitation programs influence the psychosocial outcomes? It is not clear whether time in the group class is best spent on psychosocial exercises or on communication strategies training and/or whether additional programs in these areas would be beneficial. It is also not clear whether time should be spent on other activities such as informational lectures or on additional training activities such as speechreading training. Additional research is necessary to determine the minimum amount of class time required to achieve maximal psychosocial benefit.
2. Does instructor training influence psychosocial outcomes in group audiologic rehabilitation programs? Instructors may include audiologists, psychologists, social workers, and/or peer mentors (individuals with hearing loss). As a result of their training, psychologists or social workers can turn "group classes" into "group therapy," but it is not known whether this will result in improved outcomes. It is also not known if the psychological framework used within the program would have an influence on the outcomes. As a result of their hearing loss, peer mentors can serve as empathetic role models during a group audiologic rehabilitation class, but it is not known whether this will result in improved outcomes in comparison with programs led by audiologists.
3. What is the ideal test battery to assess the psychosocial benefits of a group audiologic rehabilitation program? Research is needed to determine if the test battery should include measures of psychological mood and/or psychological stress.
4. Which participant demographic characteristics should be evaluated in the design of future research? The following demographic characteristics may influence the psychosocial benefits measured from group audiologic rehabilitation programs: age, gender, service delivery system (private pay, VA, national health care), existing use of communication strategies, and duration of hearing aid use. Future research needs to determine how these participant characteristics influence outcomes so that effective programs can be designed to meet all participants' needs.
5. Do experienced hearing aid users have different hearing loss–related psychosocial needs than new hearing aid users? Evidence suggests that despite successful hearing aid fitting, some individuals still report social and emotional effects of hearing loss. Research is necessary to determine which experienced hearing aid users could benefit from group audiologic rehabilitation programs and to determine whether unique class content is required to achieve improvements in psychosocial outcome measures. Perhaps flexible class content with an emphasis on individual concerns and problems would be beneficial for experienced hearing aid users in a group audiologic rehabilitation program.

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